EFFECTIVENESS OF LEARNING TASK PACKAGES IN BIOLOGY ON SCIENTIFIC APTITUDE OF STUDENTS AT CLASS-XI

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INTRODUCTION

All the educationist and psychologists have accepted that learning is important for cultivation for the cultural and cultivated society, we will have to accept the one way and that is education, which is really the first and for most way. So we should make the child learn. The education provides the proper opportunities to develop each individual's skills for the successful life, by which each and every one can help in the modification of their countries' economic and social development. The task of Biology teachers is to develop and experiment new strategies which will help the students to acquire the ever increasing knowledge of science. Learning Task Package in Biology help students to develop their perspective and interconnected concept, developing the ability of self learning in Biology subject.

NEED OF THE STUDY

At the higher secondary school level, the learning of Biology includes concepts and basic fundamentals, which are presented in the simplest form at lower grades and are presented in a greater detail and complexity with the movement to the higher grade. So there is a need for giving Higher Secondary Students a feel in the process of learning. Effective learning of Biology could be possible when we give the students the space to think, relate, connect and judge through the instructional material. For such cognitive and affective development, the Learning Task Packages in Biology help students to develop their perspective and interconnected concepts.

OBJECTIVES OF THE STUDY

1. To study the effectiveness of Learning Task Packages on student's concept attainment in relation to their scientific aptitude.
2. To derive findings, education implications and make a recommendation for concept teaching in Biology.
3. To construct Concept Attainment test in Biology to measure effectiveness of the programme.

VARIABLES OF THE STUDY

The following variables are considered in the present study.

1. Independent Variables
*   Learning Task Packages
*   Scientific Aptitude

2. Dependent Variables
*   Concept Attainment

3. Controlled Variables
*   Class-XI
*   Subject- Biology

HYPOTHESIS OF THE STUDY

For the quantitative study hypotheses were constructed as under:

Ho_1. There will be no significant difference between the mean scores of concept attainment of the experimental and controlled group.

Ho_2. There will be no significant difference between the mean scores of concept attainment in the experimental group and controlled group in relation to their scientific aptitude.

Ho_3. There will be no significant difference between the mean scores of concept attainment in high scientific aptitude students and low scientific aptitude students in the experimental and controlled group.

Ho_4. There will be no significant interaction effect of treatment and scientific aptitude on concept attainment.

POPULATION AND SAMPLE OF THE STUDY

The population for the present study comprises of Gujarati Medium schools of Higher Secondary level of Anand district. In the present study, the students of standard XI of R.P.T.P. Higher Secondary School (80 Students) was considered for the experiment as a sample for the experiment.

TOOLS FOR DATA COLLECTION : STANDARDIZED TOOLS USED
Scientific Aptitude Test:

Scientific Aptitude Test constructed and standardized by Dr. Meeta Patel, was applied. The aim of using this test was to know the Scientific Aptitude of the students. Scientific Aptitude Test constituted in five sections. In the first section, 9 items are there. In the second section, 10 items are there. In the third section, 8 items are there. In the fourth section, 8 items are there. In the fifth section, 7 items are there. Scientific Aptitude Test is standardized and reliability of this test is established with the help oftest-retest method. The validity is established with the help of criterion validity, content validity, and face validity.

TOOLS CONSTRUCTED BY THE RESEARCHER

The tools constructed by the researcher were given below:
1. Check List, 2. Learning Task Packages, 3.Concept Attainment Test

1.   Check List:

The researcher first read the textbook of standard XI Biology and list out the units/concepts from the chapters. On that basis, the researcher prepared Check List and it was given to the experts in the field of education, science and school teachers. They were requested to mark the concepts in Biology and also asked to comment on that. From the opinion of experts, the concepts were selected for the development of Learning Task Packages in Biology.

2.   Learning Task Packages:

The researcher constructed Learning Task Packages for finding its effectiveness in the experiment group. With the opinions of experts the researcher selected Concepts of Biology for the development of Learning Task Packages which is listed below:
● Living Organisms ● Cell Structure ● Cell Cycle and Cell Division
● Plant classification ● Animal Classification (till Echinodermata)

2.1 Construction of Learning Task Packages in Biology:
 Construction of Learning Task Packages in Biology was given below:
1. Listing of Concept, 2. Concept Map, 3. Developing Learning Based Activities
4. Learning Techniques and Tactics, 5. Audio Video Clips

The way toward creating Learning Task Packages the specialist first read the content and chose the ideas in Biology with the assistance of specialists through the check list. After that, concept maps were created of chose concept. At that point learning exercises in light of concept maps and constructivist approach was produced. Modalities of classroom association were chosen. Sound Video Clips were incorporated into Learning Task Packages for better comprehension of the concept. Last Learning Task Packages were approved with the assistance of specialists. The perspectives, proposals and remarks of specialists were fused in the Learning Task Packages and the Packages were concluded.

3.   Concept Attainment Test:

Concept Attainment Test in Biology subject of Class-XI was constructed as per the blueprint and was given to the experts for validation. Concept Attainment Test was used for finding achievement of students in concepts of Biology. In this test, the items were both close-ended and open-ended. Concept Attainment Test was of 50 marks. The test included objective, short answers and essay type answers.

*   **RESEARCH DESIGN**

The present study is the experimental study with post-test only control group design. Treatments viz. (Traditional Approach and Learning Task Packages) were given to the students of Class XI and Concept Attainment test was administered as a post-test to find out the effectiveness of Learning Task Packages.

DATA COLLECTION

Quantitative data were collected on Learning Task Packages from the R.P.T.P. Higher Secondary School, Vallabh Vidyanagar. Two divisions of Class-XI were selected for the study. 40 students of N division were selected for the experiment called experimental group. Learning Task Packages was implemented in this

class. 40 students of M division were taught through the traditional approach called controlled group. Quantitative data were collected after implementation of the experiment through Scientific Aptitude Test and Concept Attainment Test.

ANALYSIS AND INTERPRETATION OF THE DATA
In the present study, Quantitative data was analyzed through t-Test and ANOVA for Factorial design.

Hypotheses – 1
Ho$_1$. There will be no significant difference between the mean scores of concept attainment of the experimental and controlled group.

Group	N	Mean	SD	SED	t ratio	Sig. P-Value
Controlled	40	33.95	7.18	1.13	- 6.156	0.042
Experimental	40	42.40	4.87	0.77		

Table 1.0
Comparison of the students of the Experimental and Controlled groups in relation to their scores on Concept Attainment

Table: 1.0 indicate that the t value obtained from the mean scores of concept attainment of the experimental group and the controlled group is -6.156. The significant P value obtained here is 0.042, which is less than 0.05. So, Ho$_1$: "There will be no significant difference between the mean scores of concept attainment of the experimental and controlled group" is rejected.

The mean scores of experimental group on concept attainment is 42.40, which is significantly higher than the mean scores of the controlled group on Concept attainment. Thus, this indicates that the experimental group is higher in scores on concept attainment than the controlled group.

Hypotheses – 2, 3 and 4
Ho$_2$. There will be no significant difference between the mean scores of concept attainment in the experimental group and controlled group in relation to their scientific aptitude.

Ho$_3$. There will be no significant difference between the mean scores of concept attainment in high scientific aptitude students and low scientific aptitude students in the experimental and controlled group.

Ho$_4$. There will be no significant interaction effect of treatment and scientific aptitude on concept attainment.

Group	N	Mean	SD	Std. Error of Mean
Controlled	21	35.09	7.56	1.649
Experimental	26	42.69	5.04	0.988

Table 1.1
Descriptive Statistics of Concept Attainment Test for Post-Test Data for Total Sample

Treatment	Scientific Aptitude (SA)	N	Mean	SD	Std. Error of Mean
Controlled	High SA	9	39.66	5.59	1.863
	Low SA	12	31.66	7.17	2.069
	Total	21			
Experimental	High SA	16	44.75	4.38	1.095
	Low SA	10	39.40	4.37	1.382
	Total	26			

Descriptive Statistics of Concept Attainment Test with reference to the Level of Scientific Aptitude and Types of Group for Total Sample

Source	Sum of Squares	df	Mean Square	F	Sig.
Group	460.20	1	460.20	15.48*	0.000
SA_G (Scientific Aptitude Group)	499.30	1	499.30	16.79*	0.000
Group*SA_G	19.67	1	19.67	0.66	0.420
Error	1278.06	43	29.72		
Corrected Total	2257.23	46			

Note:*Denotes for Significant
Analysis of Variance for Post-test Scores of Achievement of Scientific Aptitude and Concept Attainment for Total Sample

Table: 1.1 indicate that the mean score and SD of the controlled group are 35.09 and 7.56 and that of the experimental group are 42.69 and 5.04 respectively.

1. Obtained F-ratio for df = 1 is 15.48 and significant value is 0.000, which is less than 0.01. Hence, the Ho$_2$: "There will be no significant difference between the mean scores of concept attainment in the experimental group and controlled group in relation to their scientific aptitude" is rejected.

Thus, the students of Class-XI learning Biology through Learning Task Packages was found effective than the traditional approach on total concept attainment.

2. Obtained F-ratio for df = 1 is 16.79 and significant value is 0.000, which is less than 0.01. Hence, the Ho$_3$: "There will be no significant difference between the mean scores of concept attainment in high scientific aptitude students and low scientific aptitude students in the experimental and controlled group" is rejected.

Thus, the students of Class-XI having high and low scientific aptitude learning Biology through Learning Task Packages was found effective than the traditional approach on total concept attainment.

3. Obtained F-ratio for df = 1 is 0.66 and significant value is 0.420, which is more than 0.05. Hence, the Ho$_4$: "There will be no significant interaction effect of treatment and scientific aptitude on concept attainment" is not rejected.

Thus, there was not found interaction effect on students of Class-XI having high and low scientific aptitude and treatment (Learning Task Packages and Traditional Approach) learning Biology on total concept attainment.

FINDINGS OF THE STUDY
Following are the findings of a quantitative analysis of the study:
1. Learning Task Packages in Biology was found more effective on concept attainment as compared to traditional approach.
2. Learning Task Packages for teaching Biology was found effective as compared to traditional approach on total concept attainment.
3. Learning Task Packages for teaching Biology was found effective for students having high and low scientific aptitude as compared to high and low scientific aptitude students who learned Biology through Traditional approach for their concept attainment.
4. Interaction effect of scientific aptitude (high and low) and Treatment (Learning Task Packages and Traditional Approach) was not found significant on concept attainment in Biology.

IMPLICATIONS OF THE STUDY
Following are the academic implications:
1. Learning Task Packages would be used to increase the Biology learning finding out of Class-XI students.
2. Learning Task Packages are very priceless to create interest among the students in the direction of Biology subject.
3. Learning Task Packages can be implemented to enhance the learning of students with High and Low Scientific Aptitude and Scientific Creativity.

RECOMMENDATIONS FOR THE FURTHER STUDIES
Following are the recommendations for the further studies:
1. A study could be carried out on Learning Task Packages in various higher secondary school subjects like Physics, Chemistry, Mathematics, Languages, etc.
2. Teacher educators should teach through Learning Task Packages in their pedagogical classrooms for developing insight in their student-teachers.
3. A study could be carried out to find the effectiveness of different learning techniques and tactics in different school subjects.

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